

NOURSE (W.E.C.)

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his kind regards.

SHORT AND PLAIN HISTORY
OF
CHOLERA;
ITS CAUSES AND PREVENTION;

WRITTEN FOR POPULAR USE.

BY

WILLIAM E. C. NOURSE, F.R.C.S.

FELLOW OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY; AUTHOR OF "TABLES FOR STUDENTS;" LATE SURGEON TO THE EAST AND WEST COWES DISPENSARY; AND FORMERLY DISTRICT ACCOUCHEUR TO ST. MARY'S HOSPITAL, AND MEMBER OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

"The developement of the public health is a science and an art. . . . It is the office of medicine to raise men up to a high standard of health, and not merely to heal the sick. . . . Cholera only shows in high relief what exists in ordinary circumstances. Medical men rarely, if ever, treat the beginnings of diseases; and are scarcely ever consulted professionally on the preservation of the health of cities or families. . . . But the preservation and the restoration of health are parts of one science."—*Mr. Farr's Report on Cholera*

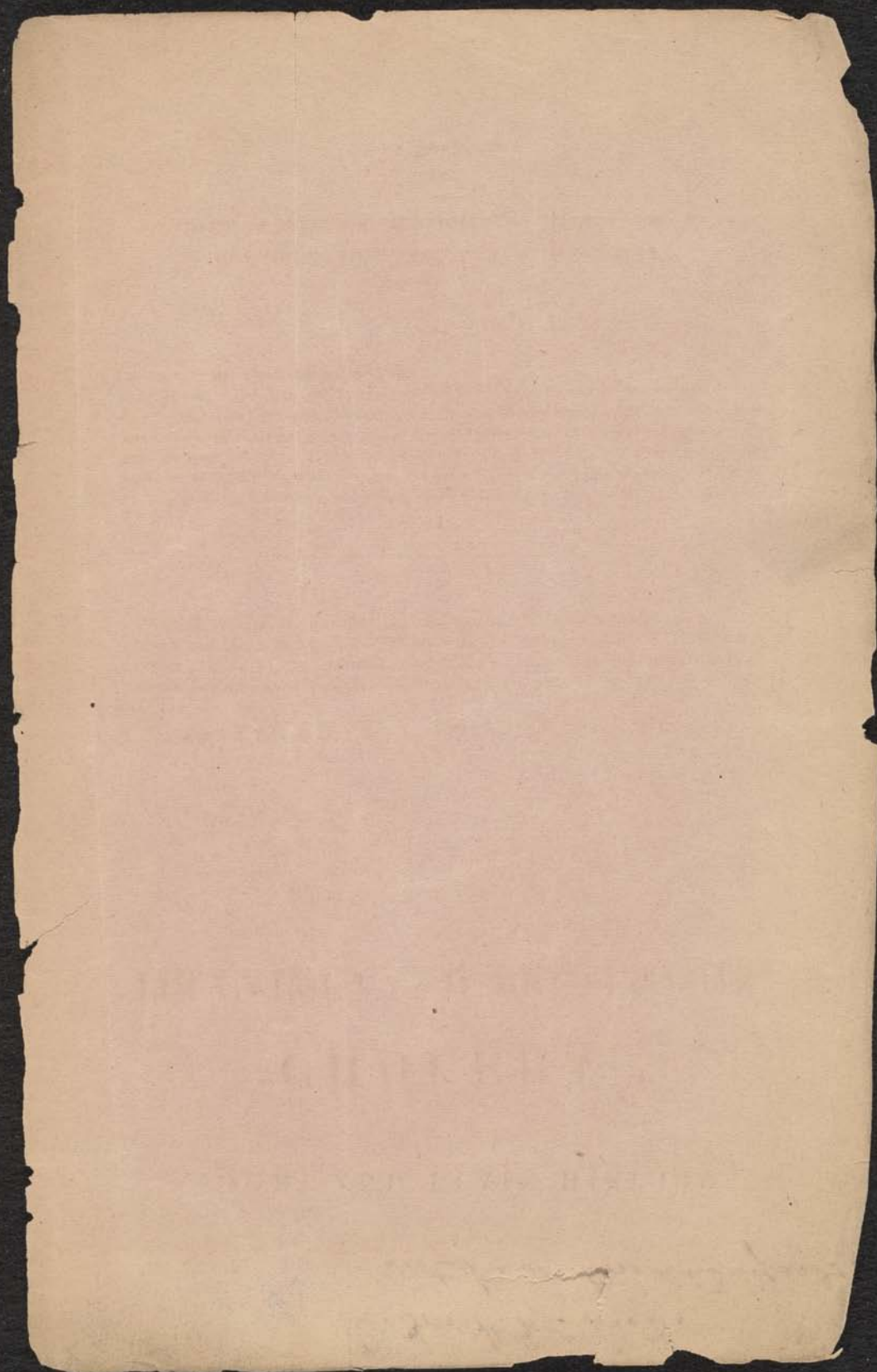
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JOHN CHURCHILL, NEW BURLINGTON STREET;

WOOLWICH: W. P. JACKSON, THOMAS STREET. ELTHAM: JOHN LACEY.

1857.

Price One Shilling.



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PREFACE.

It is only of late years that the prevention of disease has received any other than a partial and exceptional attention, and has bid fair to grow up into an established art. The origin of this art is worthy of note. Its first steps have always been promoted, and its practice continues to be urged upon the public by the very men who reap their emoluments from the existence of what they thus endeavour to remove. It is but just that this should be borne in mind by the public, in their dealings with the medical profession. For, with very little thought of themselves, medical men for many years past have worked on and on, unthanked and unpaid, in the task of investigating and exposing the causes of disease, ever seeking how best to impress them on the mind of the people, and to induce the adoption of preventive measures. The public may in time so far appreciate this, as to seek the advice of medical men for prevention as well as for cure. Medical counsel may come to be sought not only as to the sanitary state of towns, but also respecting that of ships, manufactories, places of public meeting, and private houses. The magnificent country seats of England, often rife in unsuspected causes of disease, may be sometimes inspected, that means to make them more healthy may be pointed out. And it may also be discovered how many fruitful causes of disease exist in the condition of farms, villages, and tracts of country, whereof a large proportion might be obviated at a moderate cost, under judicious advice. But that time has not arrived. Society is not yet sufficiently advanced. There is not sufficient knowledge of these things, or care for them, nor is there yet sufficient appreciation of the honest and disinterested labours which have set them forth to an almost unwilling public, nor faith enough in an honourable profession, which, with some shortcomings, has always in the main laboured for the good of its country. In the meantime it is our duty, every one in his own place, and not forgetting what is due to the profession which each of us in that place represents, patiently to continue the labours thus far began, and on all fit occasions to warn those about us, and to contribute as far as possible to the diffusion of clear views as to the causes and prevention of human suffering, weakness, and death.

Eltham, December 10th, 1857.

W. E. C. N.

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CHOLERA, ITS CAUSES AND PREVENTION.

1.—THE SUBJECT PROPOSED.

The steady advance of cholera towards this country, along its old lines of communication, and the occurrence even now of some well-marked cases of it in and around the metropolis, together with the negligence and apathy which still prevail respecting measures of prevention, betoken at no distant date a fresh visitation of the pestilence, aggravated, as on each previous occasion, by human neglect.

It would, therefore, seem useful, notwithstanding the numerous treatises on the subject, to publish a plain and brief history of cholera, designed and written for popular use, without quackery, and without technical pedantry, especially directing attention to its origin, causes, and prevention.

With these it behoves the non-medical public to be well acquainted. Cholera is now likely to be a frequent visitor to this country; and upon the completeness of our preventive sanitary measures, depends, under God, our safety from it. The medical treatment of cholera rests with the profession alone; but in measures of prevention all classes and parties must concur, each heartily doing his duty in his own place. It is hoped that the short-comings of many persons in this matter, short-comings only too common, and too fruitful of melancholy results, are more frequently due to imperfect knowledge and remembrance of the fostering causes of disease, than to wilful neglect, selfishness, or obstructiveness. And it is certain that the fatality of cholera in former visitations was much increased by insufficient acquaintance on the part of the public with its nature and premonitory symptoms, and with the necessity for *early* medical advice. To put some in mind, then, of these two points, and to press once more their importance upon as many of the public as can thus be reached, is the object aimed at in the following pages.

2.—HISTORY OF CHOLERA.

The exact point of origin of an epidemic disease is always difficult to make out. Commonly, in the first instance, some mild and not very important disorder of the kind is occasionally observed. After a time, perhaps, when men have become familiar with it, an aggravated form of it breaks out, lasts its day, and subsides; and thus in the course of years other outbreaks occur, and the disease at length becomes more formidable and frequent, and attracts greater attention. By and bye, in connection with some particular place or event, a new and malignant type of it suddenly appears as a violent epidemic, defies all medical treatment, and commits frightful ravages. It then begins to travel, moving at a rate and in a course which definitively accords with the circumstances of certain agencies that seem to propagate it; and, traversing many countries, it long retains its original intractable character, while committing its first havoc among the various races of mankind. Finally, after many years, becoming more amenable to remedial measures, it assumes an erratic tendency, and takes rank as a known and established

epidemic disease, wandering up and down the world.

Such has been very much the history of cholera; an epidemic, which, long known in a milder form, and prevailing like any other ordinary disease, after a while began to make itself notorious by more prominent and dangerous outbreaks, burst at length upon the world like one of the ancient pestilences, and now continues to move about from country to country, filling them with desolation and alarm. So threatened, and so situated with regard to it, all educated persons, who are not already familiar with some work upon the subject, must desire to be rightly informed concerning the principal points in its history and manifestations.

In the form of ordinary *bilious cholera*, this disease was known to the old physicians of Greece and Rome, as well as in later times both in Europe and Asia. Cases of a severer kind now and then occurred; and, multiplying in the course of years, became noted as *spasmodic cholera*, which chiefly prevailed between the tropics, and, though more rarely, in unusually hot seasons, in northern countries. Occasionally, either the bilious or spasmodic cholera became epidemic, in some particular season or country, committed more or less extensive ravages, and then disappeared again. Such were the violent English epidemics of 1669 and 1680, and the Indian one of 1695. In the subsequent century, cholera became principally known in connection with India. Various epidemics of the spasmodic form occurred in different parts of that vast country, but all local and temporary, and none equal to the fierce pestilence of later years. Thus, in 1762 it prevailed in Upper Hindostan; it was also frequent in the Carnatic, and on the Coromandel Coast, in which latter locality it assumed upon one occasion a remarkably malignant type; again, in 1780 and 1781, it prevailed in many parts of India, and in 1783 it broke out in a great concourse of pilgrims at Hurdwar on the Ganges, and carried off some thousands of them, but did not spread to any distance.

At length, in 1817, a new, malignant, and rapidly spreading form of the disease appeared in the marshy and jungly tract of country which forms the Delta of the Ganges, among the crowded, filthy, low-lying native towns. This was the *pestilential or malignant cholera*. It swept off the population by thousands, defied all medical treatment, and was communicated from place to place with fatal effect.

In 1818 it spread in every direction from its place of origin, east, west, north, and south; travelling not rapidly, but at a certain fixed rate, apparently about 60 miles a month. It visited in succession all the surrounding countries, even to the Indian Archipelago, the Philippine Islands, China, Chinese Tartary, Mongolia, Thibet, Persia, Arabia, and Palestine; and by the year 1823 arrived at Orenburg and Astrachan. Here it ceased for a time, prevailing in the interim in Persia, and in Chinese Tartary; but in 1829 and 1830 it re-appeared in Orenburg and Astrachan, from whence it ascended the Volga, and got to Moscow. It further proceeded to Riga, St. Petersburg, and the central parts of Russia, and followed the Russian army in Poland. It extended through Austria and Germany, and in September, 1831, appeared at Hamburg. At the same date it was at Smyrna and Constantinople, and was conveyed by a caravan from Mecca to Cairo, where 10,400 Mahomedans shortly died of it.

Having reached Hamburg in September, 1831, its first appearance in England was at Sunderland in October, at Newcastle-upon-Tyne in November, and at Shields, Tynemouth, Gateshead, and other places in December. It

appeared in London *close to the shipping* in February, 1832. In Scotland and Ireland its first appearance was *at the seaports on the eastern coast*.

Conveyed across the Atlantic in an emigrant ship, it appeared at Quebec in June 1832, and spread to Montreal and other places. New York was shortly attacked. From thence it passed successively through the states, and so traversed almost all America.

It appeared at Calais in March, 1832, and was believed to have been brought from England. In that and the subsequent years it ravaged France, Spain, and Italy, re-appeared in England in 1834, and continued to devastate various parts of Europe up to the end of 1837.

About the year 1838, pestilential cholera disappeared from Europe. But in 1842 it broke out in Burmah, and in the following years it spread through the various provinces of India, until in 1846 it reached Persia, where it experienced a considerable aggravation. During 1847 it proceeded into Russia, at the same rate and along the same lines of communication, by which it had passed before. In this year I predicted its speedy re-appearance in England. In June, 1848, it got to St. Petersburg and Berlin; it was at Hamburg in September, and at Edinburgh in the beginning of October. It appeared in London at the end of September, increased rapidly in October, and continued prevalent in November and December, until it receded for a time before the cold of winter.

At this point it is well to note, how remarkably the public health in a manner advanced to meet the pestilence, or was prepared for its reception. Mr. Farr observes, "The deaths from Cholera in England were 331 in 1838; 394 in 1839; 702 in 1840; 443 in 1841; and 1620 in 1842. The deaths from diarrhoea in the five years (1838-42) were, 2482, 2562, 3469, 3240, and 5241." (*Report on Cholera*.) Compare these numbers, and the dates in the next paragraph below, with the history of the second approach of the epidemic cholera just given.

The summer of 1842 closely resembled that of 1857, now passed; the heat being both unusual and of long continuance, more like an African than an English summer. I saw a good deal of choleraic diarrhoea in Sussex, and one case (related by me in the "*Medical Times and Gazette*,") of true cholera, which nearly proved fatal. The same was observed in most parts of the country. Cholera and diarrhoea increased in the following years, 1843, 1844, and 1845, and in the summer quarter of 1846 a severe epidemic prevailed. The form was English cholera, running on to spasmodic cholera in some of the extreme cases. It was in this very season that the epidemic cholera acquired great force in the East. In 1847, a severe winter, the famine in Ireland, and general distress among the poor, contributed to depress the public health; inflammation of the lungs, typhus, and the eruptive fevers, prevailed; and the deaths from cholera and diarrhoea still increased in number. The same influences continued in undiminished power in the spring and summer of 1848. Thus while the pestilence was still afar off, was its approach hinted at by certain changes in the public health, which paved the way for it.

The cholera having destroyed 1,934 persons in England and Wales in 1848, advanced rapidly in the summer of the succeeding year. It attained its greatest height in August and September; in the following months it declined, and died away at the end of the year, having carried off 53,293 persons. Its

ravages were in proportion in Ireland and Scotland; as well as in Norway, (where, at Bergen, a well-filled graveyard was pointed out to me), in Sweden, Prussia, and other parts of Europe. In 1850 it had almost disappeared from London. In 1851 and 1852 it continued wandering about in Europe, America, and other parts of the world, and then, by its approach again towards these shores, induced me once more to predict the visitation of 1853-54. Mr. Barwell, at the same period, took other and remarkable ground in foretelling the advent of cholera, which he predicted from observing the steady increase in zymotic diseases, especially typhus fever, which had taken place. In fact, as the epidemic deliberately travelled towards us, corresponding changes, as before, took place in the public health. The following table, selected from the Returns of the Registrar-General, shews, first some instances of these changes, in the increase both of zymotic diseases, and of diseases of the digestive organs; and, secondly, the outbreak and ravages of the pestilence itself, in the London district:

DEATHS IN LONDON.						
	In the Years . .	1850.	1851.	1852.	1853.	1854.
From Typhus		1,923	2,346	2,164	2,649	2,669
Pneumonia		3,108	3,684	3,271	3,938	3,976
Diseases of Stomach, Liver, and other digestive organs		2,955	3,196	3,235	3,349	3,420
Cholera		127	213	162	881	10,708
Diarrhoea		1,881	2,271	2,164	2,310	3,235

The whole mortality from Cholera in 1854 in England and Wales, was considerably less, especially in country districts, than in 1849. It was, however, very general; and deaths occurred from it in almost every county. It also prevailed in Ireland and Scotland, carried off thousands of persons in some parts of Europe, visited the Mauritius, North America, the West India Islands, &c. and was even said to be decimating the Esquimaux! It disappeared from England in the winter of 1854-55, but as the summer advanced, it once more showed itself, as usual, in different parts of Europe and America, and especially ravaged Venice, Rome, and Dantzic. Sporadic cases occurred in London, and a petty epidemic of it at Sunderland. At Dantzic there were 1900 cases, and 1200 deaths.

In the commencement of 1856, we find typhus unusually prevalent in London, though the general mortality was below the average. In Vienna 12,000 cases of typhus were reported to have occurred during the winter. Later in the year, cholera was heard of at Lisbon. Then, "cholera broke out at sea, among some Portuguese troops, that left Lisbon on the 20th of June, and when they landed at Funchal a fair was being held, the troops mixed with the inhabitants, and cholera broke out amongst the latter." It is also mentioned as being at one of the Cape Verd Islands, in India, and at Moscow.

In the spring of 1857, the mortality was for some time below the average. Typhus was less fatal than usual; but a disproportionately large share of it was observed in the east of London. In April there was a brief epidemic of asthenic bronchitis throughout the London district; but in May a marked improvement took place in the public health, which continued unusually good, as long as the weather, hotter than had been known for years, remained steady. As soon as it became variable, which was about the 28th of June,

diarrhœa began to prevail with more force than had hitherto been observed so early in the season, and ran on as an epidemic.

The following table shews how it has swelled the mortality beyond that of the corresponding quarter in the last two years, and also portrays the ebb or flow of some other important diseases :

DEATHS IN LONDON			
During the quarter ending with September	1855.	1856.	1857.
From Typhus	647	573	572
Pneumonia	492	581	455
Diseases of Stomach, Liver, and other digestive organs	799	807	883
Diarrhœa	1,258	1,610	2,343
Cholera	106	131	177

The steady increase of the last three items is significant ; while the absence of increase of two such diseases as typhus and pneumonia, possibly denotes less general proclivity towards pestilential disease, than was observed on former occasions. The probability therefore is, that the cholera will come, but will prevail more partially. In the country districts, however, fevers and other zymotic diseases have prevailed extensively, in addition to epidemic diarrhœa, and a few cases of cholera. Typhus among cattle has been noted up and down the country, and, in one locality, cholera. ("Lancet," June 20). Typhoid fever has of late shewn itself in the environs of the metropolis more frequently than usual; and an epidemic sore throat is now beginning to prevail in different parts of the country.

Such is our present state of health in England. Let us now see what the cholera has been doing. It has appeared in several parts of India, at St. Petersburg, and in Sweden. Past experience has shewn that we must always view with suspicion its presence on the shores of the Baltic or the Elbe. In 1855 it was at Dantzic. In 1856 it seems to have receded from those regions, but we hear of it at Moscow. Now, in 1857, it is at St. Petersburg, and in Sweden, having carried off, in the latter country, more than 5,000 persons. Later accounts speak of it at Hamburg, and Gluckstadt, besides several of the Baltic ports. Next, we find it in the Thames, on board a ship which has touched at Gluckstadt. Then it breaks out at West Ham, in a row of houses past which cattle imported from Hamburg are driven. Of the smell from these animals the inhabitants complain. The water, also, which supplies these houses, is bad, being contaminated by soakage from cesspools, and from a foul tidal ditch communicating with the Thames. One or two suspicious cases occur here and there about London; and on the 29th of October a sea-man dies of cholera on board a ship in the Commercial Dock.

Thus is brought as nearly as possible to the present time the history of cholera from its earliest origin. For the future of cholera, everything appears to indicate its settling down into a familiar epidemic, divested of its first terrific and intractable character, but still a most formidable disease.

3.—CAUSES OF CHOLERA.

The purpose and object of cholera, or of any other pestilence, in the economy of Providence, can be at best but darkly understood. That it is like everything else, an instrument or means to some unseen end, we cannot doubt, and

should ever bear in mind, reverentially acknowledging the hand of God. But this must not prevent us from enquiring into its physical nature and causes, as into those of any other natural phenomenon. There are successive orders of causes; nor is it the will of the Great First Cause of all things, that man should refrain from examining the operation of the subordinate and secular agents which He sets in motion, and ordains to bring about His will. Therefore we consider and discuss them, and in doing so, do right; nor can any approval be given to the narrow proceedings of those who would displace such a rational searching into the causation of things, to substitute for it the barren assertion, that God intends them to serve such and such a purpose. For this is a confounding together of *causes* with *reasons*; the causes of a thing being widely distinct from the object it is intended to effect, nor is the study and setting forth of the one any substitute for that of the other. Undoubtedly in this pestilence we cannot but recognize the finger of God; but *why* He has brought it upon mankind, is not so readily discerned. It is sent as a judgment, just so far as any other affliction after its kind is sent; but the particular transgression it is sent for, might perhaps be best demonstrated by investigating its physical causes. Sins of *omission*, as well as commission, oftentimes bear within them the seeds of their own punishment.

In approaching, then, the important question of the *causes of cholera*, it must be borne in mind what very various ideas are comprehended under the term. The end or object for which a thing is intended, is by many called its cause. It is customary to denominate this the final cause; though it would seem more logical to confine the term "cause" to that agency by which anything is brought about. But nothing is ever brought about by any single cause; there are many agents, all commonly spoken of as causes, which stand each in a different relation to the thing effected, be it ever so simple; and few proceedings lead to more misconceptions and disputes, than the habit of thinking and speaking dogmatically of the cause of anything, without first understanding and specifying *which* of its causes is intended. For, first of all, there is the Great Primary Cause and Father of all things, who permits us to investigate the workings of the countless inferior agents which He calls into operation and sustains. Then, among these inferior agents, there are some causes which directly *originate* a thing, and having done so, cease; there are others which cannot originate, but can only *perpetuate* that thing; other causes may be said to be capable of doing both, because they *continue regularly to originate*; others are *predisposing* causes, preparing the way for more powerful ones of either kind; and others, though immediate in their action, are only *contributing* causes, whether originating or perpetuating. And it would be easy to multiply instance upon instance like these. Perfect and truthful clearness in this matter it is impossible to attain, especially in a question so complex as the causes of disease, where, from the variable nature of the phenomena observed, the difficulty of assigning to each its true and no other value, the number and subtilty of the agents at work both within and in outward relation with the thing in question, and the constant interference of unseen cross influences, induction has to be carried on with exceeding caution, and inferences have repeatedly to be annulled or re-considered, before the true ones are arrived at.

In the present state of our knowledge, the physical causes of cholera can be only provisionally described as,

1. Causes purely and exclusively *predisposing*. These favour both its origin and spread.
2. Mixed causes, both *predisposing* and *exciting*, which favour, more or less actively, according to their degree of intensity, both the origin and spread of the disease.
3. The special causes which called the *pestilential cholera* into existence.
4. Causes of the *spread* of cholera when originated.
5. The *proximate* cause of cholera.

(1.) The principal *predisposing* cause of any very prevalent disease, is to be sought in the constitution of the people themselves. Some silent and gradual change, not itself visible, and known only by its effects, takes place in the bodies of men, preparing them for this or that disease, and such appears to be the case with regard to cholera. Again, climatic and atmospheric conditions of an unusual or very changeable kind, constitute another predisposing cause. Some persons, indeed, attribute the entire origin and spread of cholera to atmospheric influence. But a state of the atmosphere does not journey deliberately over a continent at the rate of sixty miles a month; it does not strictly confine itself to the main lines of human traffic and communication; nor does it slowly creep from village to village according as human intercourse takes place, nor accompany ships, armies, and caravans in their course.

(2.) Mere *topography* aids or determines the appearance of cholera. The immediate neighbourhood of gas-works and other offensive manufactories, foul drains or ditches, canals, rivers, ponds, thick tangled vegetation, decaying animal and vegetable matter, crowded collections of animals, manure, &c., will predispose to cholera. *Elevation of soil* is a most important element in the causation of cholera, including as it does the question of drainage. A house or a town placed upon a rising ground, has a natural drainage. Its refuse matters are washed down, whether roughly on the surface, or more perfectly in sewers, to some lower spot. Wherever they rest, whether near or far off, there they decompose; and it is the decomposition of these matters, the *emanation from organic compounds in a state of change*, that does mischief and causes disease. And where the decomposition takes place, there disease will arise. If the drainage is by the surface, the dangerous locality will be about the bottom of the slope, where the run begins to be retarded; if by sewers, at any spot where their contents leak or become exposed, and if the refuse is retained in pits or cesspools, there will the air and water be poisoned, and disease be generated. About dwellings on a flat surface, refuse naturally tends to accumulate; and the deleterious decomposition, in this case, goes on close to the houses, unless extra precautions be taken to dispose of the sewage. In towns upon a slope, the lower parts are of course most prone to disease, as everything from the other houses runs to them; and of houses by the side of a river, those nearest the mouth will be most unhealthy. For as it is the detestable custom to drain into every river and stream, the water, limpid at its source, becomes fouler and fouler as it passes down, from the contributions of filth it receives from towns and factories on its banks or from boats upon its surface, and its exhalations become deadly in proportion as they are more loaded with the products of increasing decomposition. *It is organic matter in a state of change that causes disease*. So, in a butcher's yard, not so much illness is caused, as in houses some little distance away, where the drainage from blood and offal undergoes its final decomposition.

The defective and unwholesome state of the large majority of human habitations, is one of the most active agents in aiding the progress of cholera. Even in country dwellings, this is universally the case. Rooms occupied for many hours at a time, are without sufficient means of renewing the air, which, soiled by use, is breathed by the inmates over and over again. In school dormitories, in servants' bedrooms, and in the cottages of the poor, so many persons are often crowded in one apartment, that its atmosphere becomes very deleterious. Vegetation, water, swampy ground, and collections of decaying organic matter, are permitted close to the doors; draining is imperfect, and filth is either accumulated in cesspools, or drained away to the nearest hollow, ditch, fish-pond, or piece of ornamental water, whence rise its baleful emanations. In towns, and even in some villages, these evils increase in proportion to the number of people crowded together. Here the ill-ventilated room is a minor evil; want of light is added, and dirt, its necessary consequence. The over-crowding of apartments is still carried on to a fearful extent, even in spite of the law, whose provisions are too slow and too tamely enforced to meet the evil. Deleterious exhalations rise from foul heaps and open drains, and miserable flooded courts, and rubbish-strewn alleys; on every side unwholesome manufactures, or dirty cowstalls or pigsties, scent the air, and the drainage, defective or absent, leaves the sewerage to steep the rotting floors and blackened foundations, and to soak away into the fætid, saturated earth.

In the last described unclean and crowded dwellings of the poor, cholera is often produced, or when communicated, runs riot, and sweeps off innumerable victims. But in these abodes of misery, it is aided by another cause—deficient or unwholesome food. Many of the poor are kept in a chronic state of semi-starvation. Though not actually without food, they never have enough, and often what they get is hurtful: bad bread, half-putrid fish or shell-fish, refuse scraps from the butcher or poulterer, fragments of diseased meat, and crude fruits and vegetables. Fed thus scantily and badly, if the nature of their food does not directly produce cholera, they are at least strongly predisposed to it, or to any other dangerous epidemic.

Cutting the instances of the very poor, in every class of society errors in diet cause or predispose to cholera. Over-eating, indulgence in strong drinks, and the partaking of ill-cured or ill-dressed meat, fresh pork, goose, pickled fish, shell-fish, unripe fruit, stone-fruit, or cucurbitaceous vegetables, are all causes which operate as powerful predisposants or excitants to cholera; and aperient medicine injudiciously taken has the same effect, also bad water. In like manner, any errors in the mode of living, anything which depresses the powers of life, may conduce to its origin or spread.

(3.) That which first gave origin in India to the pestilential cholera was no unusual or novel morbid agent. In the Delta of the Ganges nothing can be discovered beyond an intense aggravation of the conditions known to originate lesser outbreaks of cholera elsewhere. "The crowded ill-ventilated native huts are on mounds surrounded with pits, which are the receptacles of stagnant water, and of every kind of filth. Dr. Barnes asserts unhesitatingly that in these circumstances the Asiatic epidemic was generated from the exhalations arising from the decomposition of animal and vegetable matter, and the use of water in which this process was continually going on." Thus, as organic matter in a state of change and decomposition favours and

originates disease in temperate climates, so is it the direct cause of spreading pestilences beneath the fierce sky of the tropics, when circumstances concur to heighten its effects in any extraordinary manner.

(4.) The *causes of the spread of cholera* when originated, have occasioned much debate. The disease is certainly portable, and is conveyed by man in his journeys and voyages. It is propagated in some way or other by human intercourse, but in what way has not yet been discovered. The mere contact of skin to skin does not communicate it; nor, so far as we know, does breathing the tainted air of the sick room. Dr. Snow's theory is one of the most practically important. He regards the mucous membrane of the alimentary canal as the central point of the disease in the human frame, and directs attention to the peculiar nature and copiousness of the excretion from that membrane, the frequent and forcible ejection of which, scattering itself on every object within reach, is a prominent symptom in cholera. He says, "The bed-linen always becomes infected by the cholera evacuations, and as these are undistinguishable by the common tests (being colorless) the hands of persons waiting on the patient become soiled, and unless these persons are scrupulously clean in their habits, and wash their hands upon taking food, they must carry into the alimentary canal the means of contagion, and affect in like manner the food they handle or prepare, which has to be eaten by the rest of the family, who, amongst the working classes, often have to take their meals in the sick room. Hence the thousands of instances in which, amongst this class of the population, a case of cholera in one member of the family is followed by other cases: whilst medical men and others who merely visit the patient generally escape." Contamination of wells and water-pipes by leakage from sewers or cesspools, soaking through the soil from one to the other, is a most common occurrence; and in this way the matter of cholera evacuations may actually get into the water used for drinking, and so communicate the disease to persons who have never even seen the patient. Running streams may thus spread the disease from village to village some miles distant, since they rarely escape contamination, and are most commonly used for drinking, without heed of what places they may have flowed through. Dr. Snow strengthens his argument by adducing repeated and detailed instances of each mode of contamination of drinking water, and of the communication of cholera thereby from person to person. Whether this theory be strictly correct or not, it is admitted on all hands that the condition of the water used for drinking has the most intimate connection with the production of cases of cholera, and it is impossible to over-value Dr. Snow's services in directing public attention to the point.

(5.) Vital, telluric, and atmospheric peculiarities, locality, the decomposition and chemical change of organic matter, and some sort of infection, thus stand as *causes of cholera*; but what result do they produce in the human constitution? In other words, what is the *Proximate Cause of Cholera*?

All investigations indicate the passage into the system of a peculiar organic matter, which acts as a direct depressant and poison on the nervous centres. The nervous system, thus acted on, receives more or less of a shock, and then begins the train of morbid phenomena peculiar to the disease. These are, in brief, intense congestion of blood in the alimentary viscera, with a pouring forth of colorless evacuations, and excessive depression of the powers of life,

with spasm and coldness. These conditions must be held, in the present state of our knowledge, to represent the proximate cause of cholera.

4.—SYMPTOMS AND COURSE OF THE DISEASE.

Cholera always tends to the following succession of symptoms. It begins with *Diarrhœa*. This, which is easily curable, lasts from a few hours to as many days, passing suddenly, if not interfered with, into the stage of *Collapse*. There are now extreme depression, painful cramps, coldness of the breath, tongue, and skin, and blueness or lividity of the surface; violent discharges of watery matter from the stomach and bowels; a thick viscid condition of the blood, from this copious separation of its serum; impeded circulation, the blood remaining black; intense congestion of the alimentary viscera, and rapid sinking of the powers of life. If the patient survive, *Reaction* supervenes, which, when moderate, tends to recovery, when excessive, to fever, with suppressed secretions and inflammatory complications. Lastly, if the case continue, the patient passes into a dangerous state of *Exhaustion*. These four distinct stages of the disease are merely the more prominent and fully developed points of a continuous series of morbid phenomena.

5.—TREATMENT OF CHOLERA.

It is of the utmost importance that medical aid should be sought *early* in the disease; and that every case of diarrhœa, even the most trifling, should be at once attended to. The imperative necessity of this is now universally recognized by those conversant with the epidemic.

Great mischief is done by the publication of so-called remedies for cholera by the non-medical press, as it tempts patients, in a malady which requires the best medical skill, to try and treat themselves, whereby "much precious time is lost, and the medical attendant is only called in when, perhaps, too late." If, however, much time intervene before professional aid can be obtained, the following should be done:—For *Diarrhœa*, take 10 or 20 grains either of the Aromatic Confection or of compound Chalk Powder, remain quiet, apply warmth to the skin, and take no food except warm broth or arrow-root. If there be coldness, external or internal, take further a little brandy mixed with plenty of hot water, to which some peppermint or ginger may be added. No opiate, or purgative, should be taken without medical advice. Dr. Robert Dickson judiciously says, "If you have eaten some indigestible article of food, take an emetic. In most houses some flower of mustard is to be found; a small table spoonful of this, with two table spoonfuls of common kitchen salt put into a tumbler of water, and drank off quickly, will generally act as an emetic, which will relieve the stomach." If cramps, vomiting, and blueness or coldness of the skin are present, the mustard and salt emetic should be given immediately; the patient should rest in bed, with plenty of bottles of hot water applied wherever they are required, and a large mustard poultice should be put over the whole abdomen. These and similar measures are all that can with advantage be done until the medical man is seen.

6.—PREVENTION OF CHOLERA.

Careful perusal of the preceding pages will have suggested many preventive measures; which will be most successful if not so much directed against cholera as against all causes of ill-health. First, all those personal means usually re-

commended to maintain the highest state of bodily vigour, are to be employed here. Clothing should be warm, and flannel next the abdomen is useful.

Secondly: It is essential that all such sources of malaria as gas-works, leaky cesspools, open soil pits, mixen or manure heaps, grave yards, poultry yards, cattle sheds, pigsties, slaughter-houses, &c., be removed from the vicinity of human dwellings; or if this cannot be done, there is no choice but to abandon the houses as unfit for human residence. One or the other must give way. Near country houses, ditches should be cleaned and kept free from impurity, wet land be drained, farm-yards be decently ordered, and the over-growth of plantations and hedges be limited.

The proper location of residences is of great importance in preventing cholera. "The habitations of a people should be raised on dry, drained land of a certain elevation, washed by rains, and ventilated by the breezes of heaven." There should be shelter to the north and east, and free exposure to the south and west. Situations or houses irremediably unhealthy should be quitted; nor are landlords justified in building houses, a commodity of which the law of supply and demand is so peculiar, in unhealthy spots. House owners who let, have much to answer for. To their negligence and cupidity is owing a large share of the physical and social evils of the people. Some powerful interference is loudly called for. It is well to respect the rights of property, but even property itself must not be erected into a Moloch to be fed with human sacrifices.

(3.) The internal arrangements of houses should be made thoroughly wholesome. Light, cleanliness, and space, are essential. Ventilation is most important, and may generally be effected by simpler means than the learned contrivances recently in fashion. Dryness is not less important, and no pains should be spared to secure it, both by proper selection of site, and by structural contrivance. Lastly, proper drainage and water-supply demand the most careful attention. It is by an unfortunate concurrence that the two have to be viewed in conjunction. They ought to be widely separate subjects. It is most strange to have to urge a civilized community not to drink the filterings from its own cesspools, but present circumstances make it necessary. Wells and cesspools cannot co-exist. Sewers contaminate water-pipes, and do so every day, even when the contents of each pass quickly along. It is most difficult to prevent them. How impossible, then, must it be to prevent contamination when each fluid is retained in a great reservoir in a state of rest? If cesspools are necessary, they should be water-tight and air-tight; they should never be opened without a liberal use of Burnett's solution, and some other water-supply must be sought. If wells are necessary, cesspools must be abolished, and sewer pipes be laid down to take the sewage to a distance. But wells and cesspools cannot co-exist.

In long inhabited places, the ground is necessarily saturated with foul organic matter, so that even if the cesspools be done away with, the wells cannot yield pure water. In such cases, it is better to seek a fresh water supply first, and, if financial reasons prevent the cesspools from being abolished at the same time, to provide that they shall be properly constructed and managed, and never opened but with the use of Burnett's Disinfecting Fluid. Where sewers exist, *all indoor* communication with them should be carefully trapped, not the smallest aperture being anywhere allowed by which the smell from the sewers can get into the house. Ground likely to be tainted should not be

opened except in cold weather. Finally, all water used for drinking should be filtered or boiled.

(4.) That the labouring classes should be able to procure *proper* and *sufficient* food, is essential. Famine always aids pestilence. So, on the other hand does intemperance, which leaves its victims peculiarly liable to cholera.

(5.) The knowledge that cholera is capable of communication from case to case, should excite no panic, or disposition to abandon the sick. There need be no fear of its spreading, if the following precautions be observed:—Strangers should not come into an infected place, nor should persons quit their usual home and occupations, except for very special reasons. The sick should not be collected or crowded together. The healthy should not unnecessarily be associated with the sick; and one or the other should whenever advisable be removed, always to higher ground. Dr. Snow observes, "Hand-basins and towels, with sufficient water, should always be in readiness in the sick person's room, where every one should observe strict cleanliness; nurses and other people should invariably wash their hands before touching food. The healthy should be separated from the sick, and be removed to another abode when they have no place but the sick room in which to prepare and take their meals. Soiled linen (and blankets) should be (at once) immersed in water until they can be scalded and washed; for if they should become dry the matter might be wafted about in the form of dust. . . . Water into which sewers flow, or which is navigated by persons living in boats, or which is in any other way contaminated by the contents of drains or cesspools, should be entirely disused." Bedding, clothing, and all utensils about the sick, should be thoroughly cleansed before being used again. The sick chamber must not be kept too close, and it will be well to avoid inhaling the emanations, and to use disinfecting fluid,

7.—CONCLUSION.

I have thus endeavoured to set forth, winnowed from extraneous matter, the essential points in the History, Causes, and Prevention of Cholera. Of measures having for their object the prevention of disease, it is impossible to over-rate the importance. To save lives, to avert a pestilence, and to raise the physical condition of the people of our land, are surely noble objects, and worthy the attention, not of a profession only, not of a class, but of all for all are interested, and all can co-operate. It is too much the fashion to look to authorities and acts of parliament for assistance. But authority in this country is slow, and always travels two days' journey behind public opinion. A man's best legislator is himself. Facing his responsibilities, rightly valuing his powers, it is for every one to banish causes of disease by simply and fully doing his duty in his own place.

Eltham, Kent, November 17, 1857.

W. E. C. N.

